

Notice of Allowability

Application No.

09/388,031

Examiner

Eugene Lee

Applicant(s)

AKRAM, SALMAN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 9/9/05.
2. ☒ The allowed claim(s) is/are 1-4, 7, 9-28, 100-104, 107 and 109-129.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|---|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____ |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____ |

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DETAILED ACTION

Allowable Subject Matter

1. Claims 1-4, 7, 9-28, 100-104, 107, and 109-129 are allowed.
2. The following is an examiner's statement of reasons for allowance: The references of record, either singularly or in combination, do not teach or suggest at least "a metallization structure comprising a **conductive line for transmitting a signal laterally across the substrate**, the conductive line consisting essentially of: a metal layer; a **single** conducting layer overlying and substantially coextensive with the metal layer, the single conducting layer defining an **upper surface** of the conductive line, the single conducting layer selected from the group consisting of aluminum and copper; and metal spacers extending **at least substantially to a height of the sidewalls of the single conducting layer and metal layer**" (claims 1-4, 7, 9-15, and 100). Hata 0502647 A2 EPO does not disclose the titanium nitride cap (single conducting layer) selected from the group consisting of aluminum and copper. It would not have been obvious to make the titanium nitride cap either aluminum or copper since the metal line 18 underneath is already aluminum. Further, the cited prior art does not disclose the single conducting layer defining an upper surface of the conductive line, rather, the cited prior art discloses metal layers enclosing the single conducting layer so that the single conducting layer does not define an upper surface of the conductive line.

Regarding claims 102-104, 107, and 109-115, the references of record, either singularly or in combination, do not teach or suggest at least "a structure for transmitting a signal across a semiconductor device, the structure comprising a conductive line, the conductive line consisting essentially of: a metal layer; a single conducting layer overlying and substantially coextensive

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with the metal layer, the single conducting layer defines an upper surface of the conductive line, the single conducting layer selected from the group consisting of aluminum and copper; and metal spacers extending at least substantially to a height of the sidewalls of the single conducting layer and metal layer.”

Regarding claims 16-25, and 101, the references of record, either singularly or in combination, do not teach or suggest at least “a metallization structure, comprising a substrate having a metal layer extending over the substrate, the metal layer at least underlying a conductive line; a conductive layer of the conductive line in contact with the metal layer and the metal spacer, the metal spacer and the conductive layer substantially filling the aperture, the conductive layer having an upper surface substantially coincident with an upper surface of the dielectric layer.”

Regarding claims 26-28, the references of record, either singularly or in combination, do not teach or suggest at least “a metallization structure, comprising a substrate having a metal layer extending over the substrate, the metal layer at least underlying a conductive line; a conductive layer of the conductive line in contact with the metal layer and the metal spacer, the metal spacer and the conductive layer nearly filling the aperture, at least one upper metal layer on the conductive layer, the at least one upper metal layer having an upper surface substantially coincident with an upper surface of the dielectric layer and an uppermost extent of the metal spacer.”

Regarding claims 116-125, and 129, the references of record, either singularly or in combination, do not teach or suggest at least “a structure for transmitting a signal laterally across a substrate, the structure comprising: a substrate having a metal layer of a conductive line; a

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conductive layer of the conductive line in contact with the metal layer and the metal spacer, the conductive layer having an upper surface substantially coincident with an upper surface of the dielectric layer.”

Regarding claims 126-128, the references of record, either singularly or in combination, do not teach or suggest at least “a structure for transmitting a signal laterally across a substrate of a semiconductor device, the structure comprising: a substrate having a metal layer of a conductive line disposed thereon; a conductive layer of the conductive line in contact with the metal layer and the metal spacer, the metal spacer and the conductive layer nearly filling the aperture; and at least one upper metal layer on the conductive layer having an upper surface substantially coincident with an upper surface of the dielectric layer and an uppermost extent of the metal spacer.”

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

INFORMATION ON HOW TO CONTACT THE USPTO

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eugene Lee whose telephone number is 571-272-1733. The examiner can normally be reached on M-F 8-5.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 571-272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Eugene Lee
November 18, 2005



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